

ABSTRACT

An optical return-to-zero (RZ) signal generator and related methods are described in which a phase modulator causes a phase change in an optical signal responsive to a transition in a driving signal, and in which an interferometer receives the optical signal from the phase modulator and generates an optical pulse responsive to that phase change. Preferably, the interferometer introduces a fixed, unmodulated time delay between its two signal paths, the fixed time delay being selected such that destructive interference occurs at an output of the interferometer when the phase of the optical signal received from the phase modulator remains constant. However, when a rising or falling edge of the driving signal causes phases changes in the optical signal, the destructive interference at the output of the interferometer is disturbed, and an optical pulse is generated. The driving signal is a differentially encoded version of an input information signal. Alternatively, the driving signal is proportional to the input information signal and the transmitted RZ-formatted optical signal is a differentially encoded version of that signal. Features for regulating the fixed time delay, features for frequency shift compensation, features for loss compensation/equalization, and integrated single-chip and multiple-chip embodiments are also described.